



RECEIVED

SEP 02 2004

IN THE CLAIMS

Technology Center 2600

Please amend the claims as follows:

1. (Currently Amended) Apparatus for Doppler correction in a wireless communications system, wherein signals transferred within the system to receiving user terminals experience a Doppler effect that varies over time in relation to a user terminal position, comprising:

a first frequency synthesizer for generating a carrier signal for the transfer of data that is oscillating at a rate responsive to a first input;

a counter coupled to said first input for generating a Doppler compensation signal having a predetermined rate of change as Doppler changes over time, said counter having a clock input;

a second frequency synthesizer coupled to said clock input for generating a clock signal oscillating at a rate responsive to a rate input; ~~and~~

a rate input signal generator outputting a rate input signal coupled to said second frequency synthesizer rate input so as to adjust said rate input over time so that said Doppler compensation signal is a time varying magnitude signal with a slope that varies at a changing rate over time as to compensates for said Doppler effect at varying rates as it changes over time; and

wherein said counter is configured to have an increment value that is held substantially constant, and variations in the rate at which the counter increments in response to said second frequency synthesizer output varies the slope of said Doppler compensation signal.

2. (Original) The apparatus according to claim 1, wherein the wireless communications system comprises a satellite communications system including an earth-based gateway, a satellite, and a user terminal, and said frequency correction apparatus is located at said earth based gateway.

3. (Currently Amended) A system for frequency correcting transmissions between first and second transceivers in a wireless communications system to minimize Doppler effects, comprising:

carrier generating means in the first transceiver for generating a carrier signal oscillating at a rate responsive to a first input;

Doppler compensation means coupled to said carrier generating means for generating a Doppler compensation signal having a predetermined rate of change as Doppler changes over time; and

clock generating means coupled to a clock input of said Doppler compensation means for generating a clock signal oscillating at a rate responsive to a predetermined rate; ~~and~~

rate input means coupled to said clock generating means and adjustable over time so as to adjust said Doppler compensation signal to be a time varying magnitude signal with a slope that varies at a changing rate over time which compensates for said Doppler effect at varying rates as it changes over time; and

wherein said clock generating means is configured to have an increment value that is held substantially constant, and variations in the rate at which the Doppler compensation means increments in response to said clock generating means output varies the slope of said Doppler compensation signal.

4. (Original) The system according to claim 3, wherein the wireless communications system comprises a satellite communications system including an earth-based gateway incorporating the first transceiver, a satellite incorporating the second transceiver, and a user terminal.

5. (Cancelled)

6. (Cancelled)

7. (Currently Amended) The apparatus for frequency Doppler correction of Claim [[6]] 1, wherein increasing the rate of the clock incrementing increases the slope of said Doppler compensation signal.

8. (Currently Amended) The apparatus for frequency Doppler correction of Claim [[6]] 1, wherein decreasing the rate of the clock incrementing decreases the slope of said Doppler compensation signal.

9. (Previously Presented) The apparatus for frequency Doppler correction of Claim 1 wherein said counter generates an N-bit output Doppler compensation signal, said counter commencing counting with an initial value and counting at a rate determined by a clock signal; and

a frequency of said clock signal being set by a rate input which varies over time for a given signal for which compensation is being implemented.

10. (Previously Presented) The apparatus for Doppler correction of Claim 1 wherein said rate input is updated on an infrequent basis.

11. (Previously Presented) The apparatus for Doppler correction of Claim 1 wherein said rate input is updated in an aperiodic manner, with faster updating during periods of faster change of Doppler compensation signal, and slower updating during periods of slow change.

12. (Currently Amended) Apparatus for Doppler correction in a wireless communications system, wherein signals are generated as spread spectrum encoded communication signals and as transferred within at least a portion of the system experience a code or frequency Doppler effect that varies over time, comprising:

a first frequency synthesizer for generating a carrier signal for the transfer of data that is oscillating at a rate responsive to a first input;

a counter coupled to said first input for generating [[a]] an N-bit output Doppler compensation signal having a predetermined rate of change as it changes over time, said counter having a clock input and commencing counting with an initial value and counting at a rate determined by a clock signal at said clock input ;

a second frequency synthesizer coupled to said clock input for generating a clock signal oscillating at a rate responsive to a rate input with a frequency of said clock signal being

set by said rate input which varies over time for a given signal for which compensation is being implemented; and

a rate input signal generator outputting a rate input signal coupled to said second frequency synthesizer rate input so as to adjust said rate input over time so that said Doppler compensation signal is a time varying magnitude signal with a slope that varies at a changing rate over time so as to compensate for said Doppler effect at varying rates as it changes over time.

13. (Previously Presented) The apparatus for Doppler correction of Claim 12 wherein communication signals traverse between transmitting and receiving stations that are moving relative to each other resulting in said code Doppler.

14. (Cancelled)

15. (Currently Amended) The apparatus for Doppler correction of Claim ~~2~~ 12 wherein said signal is pre-corrected at a communication system gateway and post-corrected at a satellite.

16. (Previously Presented) The apparatus for code Doppler correction of Claim 12 wherein the frequency with which rate input is updated is increased to increase the granularity of Doppler compensation signal and allow for a closer match to a representative ideal value.

17. (Previously Presented) The apparatus for code Doppler correction of Claim 12 wherein the rate at which the clock increments is increased and a corresponding scaling factor applied to ensure a proper slope is maintained to provide for a more granular approximation.

18. (Previously Presented) The apparatus for code Doppler correction of Claim 12 further comprising frequency and phase accumulators having bit width values based upon the frequency errors which are introduced by fixed-point effects.

19. (Cancelled)

20. (Previously Presented) A method for compensating for carrier frequency and code Doppler in a communication system employing CDMA spread spectrum modulated signals, comprising:

- modulating a data signal using a coding clock signal so as to produce a coded data signal;

- modulating said coded data signal by a pre-corrected carrier signal to form a pre-corrected transmission signal;

- modulating said coded data signal by a second pre-correction modulation to independently generate a pre-corrected coding clock signal when the carrier frequency is not a multiple of the code rate.

21. (New) A method for correction of Doppler effects in a wireless communications system, comprising:

- generating a carrier signal oscillating at a rate responsive to a Doppler compensation signal;

- generating said Doppler compensation signal based on a clock signal having a predetermined rate of change as Doppler changes over time;

- generating said clock signal oscillating at a rate responsive to a rate input;

- adjusting said rate input over time according to a predetermined sequence so that said Doppler compensation signal is a time varying magnitude signal with a slope that varies at a changing rate over time which compensates for said Doppler effect at varying rates as it changes over time; and

- incrementing said clock signal at a value that is held substantially constant, with variations in the rate at which the Doppler compensation signal is adjusted in response to said clock signal varies the slope of said Doppler compensation signal.